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WHAT IS CLAIMED IS:

1. An amino acid composition having a general formula H₂N-CH(R)-C(O)-OH, wherein the R functionality comprises a fullerene species, and wherein said R functionality is hydrolysis-resistant under typical biological conditions.

- 2. The amino acid composition of Claim 1, wherein said amino acid composition is a buckyamino acid.
- 3. The amino acid composition of Claim 1, wherein said amino acid composition is 5.
- 4. The amino acid composition of Claim 1, wherein the fullerene species is selected from the group consisting of fullerenes, buckyballs, buckyonions, buckytubes, and combinations thereof.
- 5. The amino acid composition of Claim 1, wherein both the amine functionality and the carboxylic acid functionality are protected.
- 6. The amino acid composition of Claim 1, wherein one of either the amine functionality or the carboxylic acid functionality is protected.
- 7. The amino acid composition of Claim 6, wherein the amine functionality is protected with a protecting group selected from the group consisting of Boc, Fmoc, and combinations thereof.
- 8. The amino acid composition of Claim 1, wherein the fullerene species is endohedrally-doped.
- 9. The amino acid composition of Claim 8, wherein the fullerene species is endohedrally-doped with a species selected from the group consisting of radioactive species, non-radioactive species, metals, gases, spin ½ nuclei, and combinations thereof.
- 10. An amino acid residue comprising an amino acid of Claim 1.
- 11. The amino acid residue of Claim 10, further comprising at least one naturally occurring amino acid.

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12. A synthetic polymer comprising an amino acid composition of Claim 1, wherein the synthetic polymer is selected from the group consisting of peptide chains, polypeptides, proteins, and combinations thereof.

- 13. The synthetic polymer of Claim 12, wherein the synthetic polymer is a protein comprising a biological function selected from the group consisting of enzymatic, antibody, oxygen transport, ion transport, and combinations thereof.
- 14. The synthetic polymer of Claim 12, wherein the fullerene species is structure-determining.
- 15. The synthetic polymer of Claim 14, wherein the fullerene species provides for reaction "pockets" within said polymer.
- 16. The synthetic polymer of Claim 14, wherein the fullerene species serves as a link between at least two amino acids.
- 17. A method comprising the steps of:

- a) reacting compound 1 with a compound selected from the group consisting of 2, 7, 10, and combinations thereof, to yield an imine intermediate; and
- b) hydrogenating the imine intermediate with BH₃-THF to yield at least one product selected from the group consisting of 4, 9, 12, and combinations thereof.
- 18. The method of Claim 17, further comprising a deprotection step that provides for an amino acid composition of Claim 1.
- 19. The method of Claim 18, wherein the amino acid composition is a buckyamino acid.
- 20. The method of Claim 18, wherein the amino acid composition comprises 5.
- 21. The method of Claim 17, further comprising a step of forming amino acid residues that comprise an amino acid composition of Claim 1.
- 22. The method of Claim 17, wherein said amino acid residues further comprise naturally occurring amino acids.